

and not to limit the scope of the claims, and many alternatives, modifications, and variations will be apparent to those skilled in the art.

What is claimed is:

1. A method of converting a voice using a voice converting apparatus, the method comprising:

receiving a voice;

analyzing the voice to determine whether a sub-harmonic element exists between a first harmonic element and a second harmonic element of the voice; and

in response to determining that the sub-harmonic element exists, determining whether the voice is abnormal by the parameter analyzer by comparing a value of the sub-harmonic element with a predetermined value.

2. The method as claimed in claim 1, further comprising: in response to the voice determined to be abnormal, adjusting a conversion intensity of the voice by emphasizing the first harmonic element and the second harmonic element of the voice and reducing the sub-harmonic element, so as to convert the voice determined as being abnormal into a normal voice.

3. The method as claimed in claim 1, wherein the analyzing comprises:

extracting at least one pitch element from the voice; and analyzing the at least one pitch element to determine whether the sub-harmonic element exists between the first harmonic element and the second harmonic element of the voice.

4. The method as claimed in claim 1, further comprising: determining that the voice is abnormal in response to a Harmonic-to-Noise Ratio (HNR) of the voice being greater than a predetermined noise threshold.

5. The method as claimed in claim 2, wherein the adjusting comprises:

removing the sub-harmonic element from the voice.

6. The method as claimed in claim 2, wherein the adjusting comprises:

adjusting the voice by generating a harmonic signal in a high frequency band of the voice.

7. The method as claimed in claim 2, wherein the adjusting is triggered on or off according to a user input.

8. The method as claimed in claim 1, further comprising: displaying a user interface configured to receive a user input for adjusting the conversion intensity of the voice; and

setting the conversion intensity according to the user input received through the user interface,

wherein the adjusting comprises adjusting the voice based on the set conversion intensity.

9. The method as claimed in claim 1, further comprising: storing information indicating that the voice is abnormal in response to determining that the voice is abnormal.

10. The method as claimed in claim 1, further comprising: determining the voice is normal by the parameter analyzer in response to determining that the sub-harmonic element does not exist, or in response to determining that the sub-harmonic element exists and the value of the sub-harmonic element being lesser than and equal to the predetermined value; and

outputting the voice immediately in response to determining that the voice is normal.

11. A voice converting apparatus, comprising:

a receiver configured to receive a voice; and

a parameter analyzer configured to analyze the voice to determine whether a sub-harmonic element exists between a first harmonic element and a second harmonic element of the voice, and in response to determining that the sub-harmonic element exists, determine whether the voice is abnormal by comparing a value of the sub-harmonic element with a predetermined value.

12. The apparatus as claimed in claim 11, further comprising:

a normal voice converter configured, in response to the voice determined to be abnormal, to adjust a conversion intensity of the voice by emphasizing the first harmonic element and the second harmonic element of the voice and reducing the sub-harmonic element so as to convert the voice determined as being abnormal into a normal voice.

13. The apparatus as claimed in claim 11, further comprising:

a parameter extractor configured to extract at least one pitch element from the voice,

wherein the parameter analyzer analyzes the at least one pitch element to determine whether the sub-harmonic element exists between the first harmonic element and the second harmonic element of the voice.

14. The apparatus as claimed in claim 11, wherein the parameter analyzer is further configured to determine that the voice is abnormal in response to a Harmonic-to-Noise Ratio (HNR) of the voice being greater than a predetermined noise threshold.

15. The apparatus as claimed in claim 12, wherein the normal voice converter is further configured to remove the sub-harmonic element from the voice.

16. The apparatus as claimed in claim 12, wherein the normal voice converter is configured to adjust the voice by generating a harmonic signal in a high frequency band of the voice.

17. The apparatus as claimed in claim 12, further comprising:

an input unit configured to receive a user input,

wherein the user input triggers the normal voice converter to adjust the voice.

18. The apparatus as claimed in claim 11, further comprising:

a display configured to display a user interface configured to receive a user input for adjusting the conversion intensity of the voice,

wherein the normal voice converter is further configured to adjust the voice based on the conversion intensity that is set according to the user input.

19. The apparatus as claimed in claim 11, further comprising:

a storage configured to store information indicating that the voice is abnormal in response to determining that the voice is abnormal.

20. The apparatus as claimed in claim 11, wherein the parameter analyzer is further configured to determine that the voice is normal in response to determining that the sub-harmonic element does not exist, or in response to determining the sub-harmonic element exists and the value of the sub-harmonic element being lesser than and equal to the predetermined value, and